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U Outline of presentation made to Army Chief of Staff at the Pentagon. Advanced CAD equipment was described, opportunities for DoD if equipment is used were outlined, and an equipment demonstration was provided. Report contains product information and presentation script.					
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PROGRAM OBJECTIVE:

The objective of this short term task is to demonstrate state-of-the-art apparel manufacturing design technology to the Chief of Staff of the Army.

PROGRAM SCOPE OF WORK:

Georgia Tech is to set up two demonstrations of the latest apparel manufacturing design technology. The first demonstration will be a rehearsal for the second. The audience for the first demonstration will be DLA personnel and the demonstration will be held at Cameron Station, Alexandria, Virginia on a date to be determined. The second demonstration will be provided to the Chief of Staff of the Army and will be held at the Pentagon, Washington, DC on the date to be determined. The length of the second demonstration will be 30 minutes.

DEMONSTRATION PROGRAMMING:

The demonstration dates were set for October 23 (Rehearsal Demonstration) and October 24, 1989 (Chief of Staff Demonstration). The Chief of Staff demonstration was put on the agenda of the Department of Defense Clothing and Textiles Board Meeting directed by Major General Charles Henry. The location for both demonstrations was set at Room 3B 247 - the Command Conference Room of Building 4 at Cameron Station, Alexandria, Virginia where the DoD C&T Board meeting was held. Both demonstrations were set for the same location to minimize the risks of equipment failure due to teardown-moving-erection of the design system.

TASK APPROACH:

Demonstration preparations began in July 1989. The design equipment selected was the Gerber Garment Technology, Inc. "CREATIVE DESIGNER 150" system which is the same equipment located at the Apparel Manufacturing Technology Center (AMTC) pilot plant. A brochure on the equipment is included in the Appendix I. The AMTC pilot plant equipment was utilized to prepare the demonstration and vendor equipment was borrowed to present the demonstration. To minimize the risks of equipment failure before/during the demonstration, two complete systems were shipped to Alexandria, Virginia. One system was set-up on October 22 and tested to confirm its functionality. (The other system was used as standby.) The functioning system passed testing and was moved to the Command Conference Room in the morning of October 23 for the rehearsal demonstration. The equipment remained at this location until the lunch break of the C&T Board meeting when it was dismantled and shipped back to the vendor.

Personnel for the task included John Adams, Director of AMTC; Ms. Taylor Leigh, Pilot Plant Apparel Design Technician; and a hardware technician supplied by the vendor. Additionally, Georgia Tech and Southern Tech management served as task advisors.

A generalized outline and script of the presentation was prepared for review by DLA personnel. A copy of each is included in Appendix II. The outline and script included an introduction to the technology, potential applications of design systems for DoD uniform design, and applications of this "type" of technology in the area of inspecting fabric, flag design, and adaptive camouflage battle dress uniforms (BDU's). The body of the demonstration consisted of color shade and style modifications to the Army dress uniform and adapting unique woodland colors to the BDU. The demonstration was closed by answering questions and demonstrating concepts requested by the meeting attendees. The script is called "generalized" because it serves as guidance only. It was not used verbatim to keep the demonstration dynamic and flexible to conform to the interests of the meeting attendees.

The rehearsal demonstration was conducted on the afternoon of October 23 and the C&T Board demonstration was conducted at approximately 11:15 AM on October 24, 1989.



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APPENDIX I

Brochure on the Gerber Garment Technology, Inc.

CREATIVE DESIGNER 150

GERBERdesigner™

Creative Designer™ 150

Design, Merchandising and Style Development



The affordable design tool for unlimited flexibility

GGT is coloring your imagination with millions of shades and infinite textures on the Creative Designer 150 system. This dynamic graphics system, powered by original GGT software, combines ease of use with maximum functionality and matchless performance.

Designers can sketch concepts and change styles, colors and textures in seconds. Merchandisers can produce story boards and customize designs for buyers in a showroom. Style developers can instantly retrieve and rework images from the computer's memory. The Creative Designer 150 expedites the design cycle, maximizes productivity and

unleashes creativity. It saves time and money — the two most vital elements in any business.

The Power of the System 150

- Easy-to-use menus
- Fast 32-bit (CPU) computer
- 16-million color capability
- 20 megabyte removable cartridge drive
- Networking for modular configurations
- Video output to standard VCR

Enhanced Functionality

- Over 200 powerful functions
- Simulated fabric draping
- Silk-screen features
- Print queue

- Measurement capability
- Multilingual software
- Third-party software interfaces

The ultimate challenge in fashion's highly competitive environment is to be first with the best. To meet that challenge, today's fashion leaders need a tool to communicate quickly — to translate styles, colors, fabrics and shapes into dazzling fashion statements. GGT combines the power of technology with the freedom of fashion — together in one innovative tool. The Creative Designer 150.

Solutions through Technology

GGT

Gerber Garment Technology, Inc.
A Gerber Scientific Company

APPENDIX II

Demonstration Outline and General Script

U.S. ARMY CHIEF OF STAFF MEETING DEMONSTRATION

STATE-OF-THE-ART APPAREL DESIGN

Presentation Outline

- I. Introduction (Adams) - 5 minutes
 - Who we are - AMTC
 - Purpose of presentation: Demonstrate state-of-art apparel design technology and show opportunities the technology offers the Army in:
 - 1) Designing military garments
 - 2) Changing garment color/shade
 - 3) Adapting camouflage colors
 - 4) Color shade inspection
 - 5) Color/shade specification and fabric procurement
- II. Opportunities for DoD (Adams) - 5 minutes
 - This type of equipment offers several opportunities for the Army, namely
 - 1) Expedient design of new uniforms and/or uniform modifications
 - 2) Rapid color/shade evaluation
 - 3) Enable rapid procurement of camouflage BDU's better adapting to environment
 - 4) Expedite procurement of BDU uniform
- III. Equipment demonstration (Leigh) - 20 minutes
 - 1) Identify the major equipment components and state their function.
 - 2) Demonstrate a design/color change on a uniform.
 - 3) Compare color accuracy of screen & printout with actual garments.
 - 7) Show shade variations on actual garments and how this could be avoided with electronic color/shade analysis.
 - 4) Bring-up BDU uniform and show how actual colors are accurately shown on the screen and in a printout.
 - 5) Show the BDU soldier with a unique forest background.
 - 6) Modify BDU colors/shades to better camouflage with background.
- IV. Questions and Answers - 5 minutes

DEMONSTRATION TO THE ARMY CHIEF OF STAFF

[John Adams]:

Good Morning!

My name is John Adams and this is Taylor Leigh.

We are associated with the Georgia Tech/Southern Tech Apparel Manufacturing Center.

Our project, located in Atlanta, is sponsored by DLA under the MANTIC program. I serve as the Director and Taylor is a Technician, specializing in CAD systems.

We have been invited here by General Henry.

Our purpose is to expose you to Apparel CAD technology and discuss possible opportunities it offers the government.

CAD systems used for apparel design and fashion has essentially eliminated the traditional water color/chalk designs of the civilian industry of the past.

You can now generate entire fashions without timely conceptual drawings.

You can modify existing designs, print high resolution pictures for market evaluation.

You can generate an entire catalog of fashions without producing a single garment. In fact, many of the mail order houses do this and only make the garment if sufficient orders are received.

The CAD systems are proven technologies and are not to be confused with pattern-making which is an entirely different process requiring different equipment.

This is the initial step in producing a garment --conceptualizing ideas generated by a clothing designer.

Before you, is only part of a CAD system which we will demonstrate in a few moments.

The vendor brochure will elaborate on the complete system, but I'll tell you briefly what composes a complete system.

Here is the entire system except for a color printer to make a hard copy of the designs.

And, two input systems: One -- a video type scanner like this one in my hand and; two -- a paper scanner like in the brochure picture.

The input devices enable you to input existing fabric patterns if you do not want to design your own. The video scanner allows you to input models and existing fashions if you desire only to modify existing designs.

The system before you is manufactured by Gerber Garment Technology of Connecticut. There are about five companies I know who manufacture systems. Three are produced domestically.

The system is not currently used by the government to my knowledge. However, the technology offers the government three potential opportunities to reduce costs and improve performance in the applicable services.

I have determined three possible applications for this technology that may have merit for the government.

One. The equipment before you used as it is designed for style and shade modifications to military personnel uniforms.

The benefits may be similar to those of the civilian applications, namely:

- 1) speed and productivity improvements in generating shade/style designs for review;
- 2) prototype garments may not be necessary to be made, i.e., go from printout of design to production;
- 3) ability to generate a wide variety of designs in a short-time for review;
- 4) also, the equipment would be excellent for Flag Designs.

Two. Shade Matching

Currently, almost every roll of fabric to be cut into military apparel first comes to DPSC for shade acceptance and determination of conformance to specifications. The handling and warehousing of the fabric adds costs to the procurement and delays response time.

Civilian manufacturers are beginning to measure shades electronically and ship fabric directly from the textile mill to the apparel plant. Using statistical quality control, only a small number of samples are visually/manually evaluated.

For example, Levi Strauss (a blue jean manufacturer) in South Georgia maintains no more than 8 hours of fabric at their plant. Via electronic ordering and inspection, a truck carrying fabric each day unloads for only one day's production. Levi does not inspect the fabric as this was done

once at the textile mill. In fact, the variances in shade are graded in loading the truck from the front to the rear. Thus, the limits on shade are traversed only once in the truck. The fabric is cut correspondingly.

Three. Adaptive Camouflage

By speeding up procurement in releasing textile fabric rolls directly to apparel manufacturers, it may be conceivable to adjust Battle Dress Uniforms (BDU) colors to better fit the environment. Example -- plan a maneuver in 6 weeks. Maybe, you can supply the armed forces with a "Fall-Germany" BDU, not simply a woodlands BDU. Since woodland color changes for different sections of the world and for different seasons, it may be possible to supply better camouflage than a standard or single color scheme. This concept may be worth investigation.

Without further introduction, I would like Ms. Leigh to show you various design applications of the system.

[Taylor Leigh]:

Thank you Mr. Adams.

Before you on the designer screen you see a man and woman dressed in U.S. Army dress uniforms. In the next few moments I will demonstrate various design changes in the woman's uniform:

First, as you can see, the shades of the uniforms on-screen match the actual shades of these samples (show Army Dress uniform samples). This accuracy of on-screen color was accomplished by digitizing the two models directly via a video camera. Notice, the woman's skirt does not match her coat (or the man's uniform) exactly, probably because it has been worn and cleaned more than the coat. Also, the variation could be attributed to fabric dying and color shade matching before the garments were sewn. On the second screen to my left, the equipment describes the shades by three numbers to yield a numerical representation of the garment color/shade. This numerical representation is accomplished by the equipment. This technology could automate color/shade analysis of fabrics yielding a more accurate and streamlined method of procuring fabric since much of the human inspection can be replaced by machines. Human color analysis could be reduced to statistical sampling to be certain the machines stay within calibration.

I will now modify color shades on the woman's uniform to show how easily a designer can evaluate new colors and shades of an existing garment.

Notice the man's uniform uses a different style of lapels and pockets than the woman's. To demonstrate greater uniformity in the man's and the

woman's uniforms, I will put identical lapels on the woman's uniform as that of the man's. To do this, I simply make a copy of the man's lapels and superimpose them onto the woman's jacket.

I will now do the same for the pockets. Now the woman appears more to be in the same service branch as the man. (humor)

Suppose you wanted to drastically change the style of the woman's uniform. For example, before this presentation I lengthened the skirt to mid-calf length. To give the skirt more comfort and make easier to fit a large variety of figures, I now will add pleats. Now, let's change the color of the skirt to a coal black to deaccentuate the woman's robust figure.

Again, to change the style of the woman's uniform I will lengthen the jacket. Also, a large black gunbelt may improve the "look" so I will add one.

To address Mr. Adams' comments on the BDU garments, I will now pull up our male Sergeant wearing the standard Dattle Dress Uniform. Notice again, The colors on screen match well with this actual BDU top I have here.

Now, I will pull up a forest from a picture I digitized. The forest is a northern United States mountainous Birch forest. Notice the forest contains a large amount of white and black from the tree bark, yellow green from the flora and blues from the background.

Now, let's superimpose our Sergeant in this setting. Notice the Sergeant is poorly camouflaged for this particular forest. Of course we are only looking at a visible correlation. The level of camouflage at night using night vision enhancements would be different.

We can better adapt the Sergeant to the birch forest. By marking the camouflage pattern as I have done here, I can now pull colors from the digitized forest picture to make the camouflage colors exactly match the forest. This picture shows the Sergeant utilizing the camouflage I have "adapted" from the forest. Since these colors used to adapt the camouflage are numerically described on the second screen, it is quite possible to order the fabric dyed for this application and produce BDU's that better match the environment for which they are to be used. Therefore a military maneuver planned to take place in the future, say six to eight weeks, could result in special BDU's being produced and supplied specifically for the environment of the specific maneuver. Thus, the soldier would be better suited for his environment than with the standard BDU of today. Even in the same forestland, the BDU's could accommodate the colors of the different seasons.

This concludes my demonstration, I hope I have been successful in showing the ease in operation and efficiency that computer aided design equipment offers.

[Adams]

This concludes our presentation. We will be happy to try to answer any questions you may have. Thank you.